

IN THE CLAIMS:

1-26. (Cancelled)

27. (Currently Amended) A system for analyzing elements in a sample comprising:

- a combustion member comprising one of a high-frequency heating furnace and an electric resistance furnace for receiving the sample;
- a source of oxygen gas connected to the combustion member to supply oxygen gas to the combustion member as the sample is heated to gasify the elements in the sample;
- a sample section means, connected to the combustion member by an exhaust conduit, for sampling at a constant interval and at constant amounts;
- a dust filter ~~unit~~ means, operatively connected to the exhaust conduit, for removing dust;
- an oxidizing ~~device~~ means, operatively connected to the exhaust conduit, for oxidizing a gas output of the combustion member;
- a dehumidifier for dehumidifying the gas output before the gasified elements are analyzed;
- a mass spectrometer;
- a conduit connecting the sampling section to the mass spectrometer whereby the gasified elements are analyzed quantitatively by the mass spectrometer to determine at least one of an element of C, S, and N to an accuracy of 0.1 ppm; and
- a feedback circulating system for recirculating the gasified elements to the combustion member until all of the elements in the sample are adequately gasified.

28. (Cancelled)

29. (Currently Amended) A system for analyzing elements in a steel specimen, comprising:
- a combustion member for receiving the steel specimen;
 - a source of oxygen gas connected to the combustion member to supply oxygen gas to the combustion member as the specimen is heated to gasify the elements in the sample specimen;
 - an exhaust channel from the combustion member for removing the gasified elements;
 - a dust filter ~~unit~~, means, operatively connected to the exhaust channel, for removing any oxidized dust;
 - a dehumidifier ~~unit~~, means, operatively connected to the exhaust channel, for removing water vapor;
 - an oxidizing ~~device~~, means, operatively connected to the exhaust channel, for oxidizing any CO contained in the gasified elements;
 - a sampling section means, connected to the exhaust channel, for sampling at a constant interval and at constant amounts of gasified elements;
 - a mass spectrometer connected to the sampling section whereby the gasified elements are analyzed quantitatively to determine the elements in the steel specimen; and
 - a feedback circulating system connected to the combustion member and connected downstream of the dust filter unit and upstream of the mass spectrometer to provide a recirculation of a combustion gas containing the elements through the combustion member before analysis by the mass spectrometer.

30. (Previously Presented) The system of Claim 29 wherein the mass spectrometer analyzes the gasified elements to an accuracy of 0.1 ppm.

31. (Previously Presented) The system of Claim 29 further including means for providing an electric field to ionize the gasified elements prior to an introduction into the mass spectrometer including a heatable filament, an electron collecting electrode, an ion producing electrode, and an ion extracting electrode.

32. (Cancelled)

33 (Previously Presented) The system of Claim 29 further including a suction pump operatively connected in the feedback circulating system to feed back the gasified elements until the steel specimen is completely combusted.

34. (Previously Presented) The system of Claim 29 further including a valve member for selectively connecting the exhaust channel to either the feedback circulating system or the mass spectrometer.

35. (Previously Presented) The system of Claim 29 wherein the combustion member is selected from one of a high-frequency heating furnace and an electric resistance furnace.